



SEQUENCE LISTING

<110> Bertin, John

<120> NOVEL MOLECULES OF THE NBS/LRR PROTEIN FAMILY AND USES THEREOF

<130> 07334-268001

<140> US 09/848,035

<141> 2001-05-03

<150> US 60/201,464

<151> 2000-05-03

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<213> Homo sapiens

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ccc ctc gaa gac gtg cta cag aag acc cca tgg tct gag gtg gaa gag 144
Pro Leu Glu Asp Val Leu Gln Lys Thr Pro Trp Ser Glu Val Glu Glu
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gct gat ggc aag aaa ctg gca gaa att ctg gtc aac acc tcc tca gaa 192
Ala Asp Gly Lys Lys Leu Ala Glu Ile Leu Val Asn Thr Ser Ser Glu
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Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln
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Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser
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gag tta gca aag cca ggt gaa aag gaa gga tgg aga aat tca atg gag		384
Glu Leu Ala Lys Pro Gly Glu Lys Glu Gly Trp Arg Asn Ser Met Glu		
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aaa caa tct ttg gtc tgg aag aac acc ttt tgg caa gga gac att gac		432
Lys Gln Ser Leu Val Trp Lys Asn Thr Phe Trp Gln Gly Asp Ile Asp		
130 135 140		
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Leu Asn Pro Arg Thr Pro Arg Lys Leu Thr Pro Tyr Thr Val Val Leu		
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His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met		
180 185 190		
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225 230 235 240		
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Ile Leu Ala Gln Ala Gln Arg Ile Leu Phe Val Val Asp Gly Leu Asp		
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Glu Leu Lys Val Pro Pro Gly Ala Leu Ile Gln Asp Ile Cys Gly Asp		
260 265 270		
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Arg Lys Met Leu Pro Arg Ala Ala Leu Leu Val Thr Thr Arg Pro Arg		
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 Val Pro Ala Gly Arg Thr Ala Ala Gly Arg Ala Ala Asp Ala Glu Pro
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aga gcc aag gag ttg gag gcc act ttt ggc tgc cgg atg tca ccg gac 1584
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A1

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aag aag ctg aca cac ctg tgc ttg gcc aag aac ccc att ggg gat aca 2448
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 65 70 75 80
 Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln
 85 90 95
 Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser
 100 105 110
 Glu Leu Ala Lys Pro Gly Glu Lys Glu Gly Trp Arg Asn Ser Met Glu
 115 120 125
 Lys Gln Ser Leu Val Trp Lys Asn Thr Phe Trp Gln Gly Asp Ile Asp
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 Asn Phe His Asp Asp Val Thr Leu Arg Asn Gln Arg Phe Ile Pro Phe
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 Leu Asn Pro Arg Thr Pro Arg Lys Leu Thr Pro Tyr Thr Val Val Leu
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 His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met
 180 185 190
 Leu Asp Trp Thr Asp Cys Asn Leu Ser Pro Thr Leu Arg Tyr Ala Phe
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 Tyr Leu Ser Cys Lys Glu Leu Ser Arg Met Gly Pro Cys Ser Phe Ala
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 Glu Leu Ile Ser Lys Asp Trp Pro Glu Leu Gln Asp Asp Ile Pro Ser
 225 230 235 240
 Ile Leu Ala Gln Ala Gln Arg Ile Leu Phe Val Val Asp Gly Leu Asp
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 Glu Leu Lys Val Pro Pro Gly Ala Leu Ile Gln Asp Ile Cys Gly Asp
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 Arg Lys Met Leu Pro Arg Ala Ala Leu Leu Val Thr Thr Arg Pro Arg
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A1

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 Val Cys Thr Thr Leu Lys Leu Gln Met Glu Lys Gly Glu Asp Pro Pro
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 Val Pro Ala Gly Arg Thr Ala Ala Gly Arg Ala Ala Asp Ala Glu Pro
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 Pro Gly Arg Ala Gly Leu Trp Ala Gln Met Ser Val Phe His Arg Glu
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 Asp Leu Glu Arg Leu Gly Val Gln Glu Ser Asp Leu Arg Leu Phe Leu
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 Asp Gly Asp Ile Leu Arg Gln Asp Arg Val Ser Lys Gly Cys Tyr Ser
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 Ile Lys Gln Glu Leu Leu Gln Cys Lys Ala His Leu His Ala Asn Lys
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 Pro Leu Ser Val Thr Asp Leu Lys Glu Val Leu Gly Cys Leu Tyr Glu
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 Ser Gln Glu Glu Leu Ala Lys Val Val Val Ala Pro Phe Lys Glu
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 Ile Ser Ile His Leu Thr Asn Thr Ser Glu Val Met His Cys Ser Phe
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 Ser Leu Lys His Cys Gln Asp Leu Gln Lys Leu Ser Leu Gln Val Ala
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 Lys Gly Val Phe Leu Glu Asn Tyr Met Asp Phe Glu Leu Asp Ile Glu
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 Ser Thr Cys His Leu Gln Lys Val Glu Ile Lys Asn Val Thr Pro Asp
 660 665 670
 Thr Ala Tyr Arg Asp Phe Cys Leu Ala Phe Ile Gly Lys Lys Thr Leu
 675 680 685
 Thr His Leu Thr Leu Ala Gly His Ile Glu Trp Glu Arg Thr Met Met
 690 695 700
 Leu Met Leu Cys Asp Leu Leu Arg Asn His Lys Cys Asn Leu Gln Tyr
 705 710 715 720
 Leu Arg Leu Gly Gly His Cys Ala Thr Pro Glu Gln Trp Ala Glu Phe
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 Phe Tyr Val Leu Lys Ala Asn Gln Ser Leu Lys His Leu Arg Leu Ser
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A1

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 Thr Arg Pro Lys His Phe Leu Gln Met Leu Ser Leu Glu Asn Cys Arg
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 35 40 45

aaa gaa gaa ctg gct aac gtg ttg cca atc tct tat gag gga cag tat 192
 Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr
 50 55 60

ata tgg aat atg ctc ttc agc ata ttt tca atg atg cgt aag gaa gat 240
 Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp
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 85 90 95

caa tta gcc tat gat tct acc agc tat tat tca gca aac aat ctc aat 336
 Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Tyr Ser Ala Asn Asn Leu Asn
 100 105 110

gtg ttc ctg atg gga gag aga gca tct gga aaa act att gtt ata aat 384
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ttg tgt agt aac agc acc cag aaa gtt ccc att cca gtt ctc ctg gtc Leu Cys Ser Asn Ser Thr Gln Lys Val Pro Ile Pro Val Leu Leu Val 210 215 220	672
agt ttg ctg aag aga aaa atg gct cca ggc tgc tgg ttc ctc atc tcc Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser 225 230 235 240	720
tca agg ccc aca cgt ggg aat aat gta aaa acg ttc ttg aaa gag gta Ser Arg Pro Thr Arg Gly Asn Asn Val Lys Thr Phe Leu Lys Glu Val 245 250 255	768
<i>A1</i>	
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 385 390 395 400

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 485 490 495

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 515 520 525

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 530 535 540

tca tta tac tgt ctg gat tac tgc tgt cac ctg agg aca ctt aag ttg 1680
 Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu
 545 550 555 560

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 565 570 575

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 Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr 60
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 Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Tyr Ser Ala Asn Asn Leu Asn 110
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 Ser Tyr Val Val His Leu Thr Ala His Glu Ile Asn Gln Met Thr Asn 160
 145 150 155 160
 Ser Ser Leu Ala Glu Leu Ile Ala Lys Asp Trp Pro Asp Gly Gln Ala 175
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 210 215 220
 Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser 240
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 275 280 285
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 290 295 300

A1

Leu Cys Trp Ile Thr Cys Thr Val Leu Lys Arg Gln Met Asp Lys Gly
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 325 330 335
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 340 345 350
 Tyr His Leu Gly Leu Leu Lys Arg Leu Cys Leu Leu Ala Ala Gly Gly
 355 360 365
 Leu Phe Leu Ser Thr Leu Asn Phe Ser Gly Glu Asp Leu Arg Cys Val
 370 375 380
 Gly Phe Thr Glu Ala Asp Val Ser Val Leu Gln Ala Ala Asn Ile Leu
 385 390 395 400
 Leu Pro Ser Asn Thr His Lys Asp Arg Tyr Lys Phe Ile His Leu Asn
 405 410 415
 Val Gln Glu Phe Cys Thr Ala Ile Ala Phe Leu Met Ala Val Pro Asn
 420 425 430
 Tyr Leu Ile Pro Ser Gly Ser Arg Glu Tyr Lys Glu Lys Arg Glu Gln
 435 440 445
 Tyr Ser Asp Phe Asn Gln Val Phe Thr Phe Ile Phe Gly Leu Leu Asn
 450 455 460
 Ala Asn Arg Arg Lys Ile Leu Glu Thr Ser Phe Gly Tyr Gln Leu Pro
 465 470 475 480
 Met Val Asp Ser Phe Lys Trp Tyr Ser Val Gly Tyr Met Lys His Leu
 485 490 495
 Asp Arg Asp Pro Glu Lys Leu Thr His His Met Pro Leu Phe Tyr Cys
 500 505 510
 Leu Tyr Glu Asn Arg Glu Glu Glu Phe Val Lys Thr Ile Val Asp Ala
 515 520 525
 Leu Met Glu Val Thr Val Tyr Leu Gln Ser Asp Lys Asp Met Met Val
 530 535 540
 Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu
 545 550 555 560
 Ser Val Gln Arg Ile Phe Gln Asn Lys Glu Pro Leu Ile Arg Pro Thr
 565 570 575
 Ala Ser Gln Met Lys Ser Leu Val Tyr Trp Arg Glu Ile Cys Ser Leu
 580 585 590
 Phe Tyr Thr Met Glu Ser Leu Arg Glu Leu His Ile Phe Asp Asn Asp
 595 600 605
 Leu Asn Gly Ile Ser Glu Arg Ile Leu Ser Lys Ala Leu Glu His Ser
 610 615 620
 Ser Cys Lys Leu Arg Thr Leu
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 <213> Homo sapiens

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 Met Lys Ala Glu Leu Leu Glu Thr Trp Asp Asn Ile Ser Trp Pro Lys
 1 5 10 15

gac cac gta tat atc cgt aat aca tca aag gac gaa cat gag gaa ctg	96
Asp His Val Tyr Ile Arg Asn Thr Ser Lys Asp Glu His Glu Glu Leu	
20 25 30	
cag cgc cta ctg gat cct aat agg act aga gcc cag gcc cag acg ata	144
Gln Arg Leu Leu Asp Pro Asn Arg Thr Arg Ala Gln Ala Gln Thr Ile	
35 40 45	
gtc ttg gtg ggg agg gca ggg gtt ggg aag acc acc ttg gca atg cag	192
Val Leu Val Gly Arg Ala Gly Val Gly Lys Thr Thr Leu Ala Met Gln	
50 55 60	
gct atg ctg cac tgg gca aat gga gtt ctc ttt cag caa agg ttc tcc	240
Ala Met Leu His Trp Ala Asn Gly Val Leu Phe Gln Gln Arg Phe Ser	
65 70 75 80	
tat gtt ttc tat ctc agc tgc cat aaa ata agg tac atg aag gaa act	288
Tyr Val Phe Tyr Leu Ser Cys His Lys Ile Arg Tyr Met Lys Glu Thr	
85 90 95	
acc ttt gct gaa ttg att tct ttg gat tgg ccc gat ttt gat gcc ccc	336
Thr Phe Ala Glu Leu Ile Ser Leu Asp Trp Pro Asp Phe Asp Ala Pro	
100 105 110	
att gaa gag ttc atg tct caa cca gag aag ctc ctg ttt att att gat	384
Ile Glu Glu Phe Met Ser Gln Pro Glu Lys Leu Leu Phe Ile Ile Asp	
115 120 125	
ggc ttt gag gaa ata atc ata tct gag tca cgc tct gag agc ttg gat	432
Gly Phe Glu Glu Ile Ile Ser Glu Ser Arg Ser Glu Ser Leu Asp	
130 135 140	
gat ggc tcg cca tgt aca gac tgg tac cag gag ctc cca gtg acc aaa	480
Asp Gly Ser Pro Cys Thr Asp Trp Tyr Gln Glu Leu Pro Val Thr Lys	
145 150 155 160	
atc cta cac agc ttg ttg aag aaa gaa ttg gtt ccc ctg gct acc tta	528
Ile Leu His Ser Leu Leu Lys Lys Glu Leu Val Pro Leu Ala Thr Leu	
165 170 175	
ctg atc acg atc aag acc tgg ttt gtg aga gat ctt aag gcc tca tta	576
Leu Ile Thr Ile Lys Thr Trp Phe Val Arg Asp Leu Lys Ala Ser Leu	
180 185 190	
gtg aat cca tgc ttt gta caa att aca ggg ttc aca ggg gac gac cta	624
Val Asn Pro Cys Phe Val Gln Ile Thr Gly Phe Thr Gly Asp Asp Leu	
195 200 205	
cgg gta tat ttc atg aga cac ttt gat gac tca agt gaa gtt gag aaa	672
Arg Val Tyr Phe Met Arg His Phe Asp Asp Ser Ser Glu Val Glu Lys	
210 215 220	
atc ctg cag cag cta aga aaa aac gaa act ctc ttt cat tcc tgc agt	720
Ile Leu Gln Gln Leu Arg Lys Asn Glu Thr Leu Phe His Ser Cys Ser	
225 230 235 240	

A1

gcc ccc atg gtg tgt tgg acc gta tgt tcc tgt ctg aag cag ccg aag Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys 245 250 255	768
gtg agg tat tac gat ctc cag tca atc act cag act acc acc agt ctg Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Ser Leu 260 265 270	816
tat gcc tat ttt ttc tcc aac ttg ttc tcc aca gca gag gta gat ttg Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu 275 280 285	864
gca gat gac agc tgg cca gga caa tgg agg gcc ctc tgc agt ctg gcc Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala 290 295 300	912
ata gaa ggg ctg tgg tct atg aac ttc acg ttt aac aaa gaa gac act Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr 305 310 315 320	960
gag atc gag ggc ctg gaa gtg cct ttc att gat tct ctc tac gag ttc Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe 325 330 335	1008
aat att ctt caa aag atc aat gac tgt ggg ggt tgc act act ttc acc Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Cys Thr Phe Thr 340 345 350	1056
<i>A1</i>	
cac cta agt ttc cag gag ttt ttt gca gcc atg tcc ttt gtg cta gag His Leu Ser Phe Gln Glu Phe Ala Ala Met Ser Phe Val Leu Glu 355 360 365	1104
gaa cct aga gaa ttc cct ccc cat tcc aca aag cca caa gag atg aag Glu Pro Arg Glu Phe Pro His Ser Thr Lys Pro Gln Glu Met Lys 370 375 380	1152
atg tta ctg caa cac gtc ttg ctt gac aaa gaa gcc tac tgg act cca Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro 385 390 395 400	1200
gtg gtt ctg ttc ttc ttt ggt ctt tta aat aaa aac ata gca aga gaa Val Val Leu Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu 405 410 415	1248
ctg gaa gat act ttg cat tgt aaa ata tct ccc agg gta atg gag gaa Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu 420 425 430	1296
tta tta aag tgg gga gaa gag tta ggt aag gct gaa agt gcc tct ctc Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu 435 440 445	1344
caa ttt cac att cta cga ctt ttt cac tgc cta cac gag tcc cag gag Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu 450 455 460	1392

gaa gac ttc aca aag aag atg ttg ggt cgt atc ttt gaa gtt gac ctt	1440
Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu	
465 470 475 480	
aat att ttg gag gac gaa ctc caa gct tct tca ttt tgc cta aag	1488
Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys	
485 490 495	
cac tgt aaa agg tta aat aag cta agg ctt tct gtt agc agt cac atc	1536
His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile	
500 505 510	
ctt gaa agg gac ttg gaa att ctg gag tga	1566
Leu Glu Arg Asp Leu Glu Ile Leu Glu	
515 520	
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1 5 10 15	
Asp His Val Tyr Ile Arg Asn Thr Ser Lys Asp Glu His Glu Glu Leu	
20 25 30	
Gln Arg Leu Leu Asp Pro Asn Arg Thr Arg Ala Gln Ala Gln Thr Ile	
35 40 45	
Val Leu Val Gly Arg Ala Gly Val Gly Lys Thr Thr Leu Ala Met Gln	
50 55 60	
Ala Met Leu His Trp Ala Asn Gly Val Leu Phe Gln Gln Arg Phe Ser	
65 70 75 80	
Tyr Val Phe Tyr Leu Ser Cys His Lys Ile Arg Tyr Met Lys Glu Thr	
85 90 95	
Thr Phe Ala Glu Leu Ile Ser Leu Asp Trp Pro Asp Phe Asp Ala Pro	
100 105 110	
Ile Glu Glu Phe Met Ser Gln Pro Glu Lys Leu Leu Phe Ile Ile Asp	
115 120 125	
Gly Phe Glu Glu Ile Ile Ile Ser Glu Ser Arg Ser Glu Ser Leu Asp	
130 135 140	
Asp Gly Ser Pro Cys Thr Asp Trp Tyr Gln Glu Leu Pro Val Thr Lys	
145 150 155 160	
Ile Leu His Ser Leu Leu Lys Lys Glu Leu Val Pro Leu Ala Thr Leu	
165 170 175	
Leu Ile Thr Ile Lys Thr Trp Phe Val Arg Asp Leu Lys Ala Ser Leu	
180 185 190	
Val Asn Pro Cys Phe Val Gln Ile Thr Gly Phe Thr Gly Asp Asp Leu	
195 200 205	
Arg Val Tyr Phe Met Arg His Phe Asp Asp Ser Ser Glu Val Glu Lys	
210 215 220	
Ile Leu Gln Gln Leu Arg Lys Asn Glu Thr Leu Phe His Ser Cys Ser	
225 230 235 240	
Ala Pro Met Val Cys Trp Thr Val Cys Ser Cys Leu Lys Gln Pro Lys	
245 250 255	
Val Arg Tyr Tyr Asp Leu Gln Ser Ile Thr Gln Thr Thr Ser Leu	
260 265 270	

Tyr Ala Tyr Phe Phe Ser Asn Leu Phe Ser Thr Ala Glu Val Asp Leu
 275 280 285
 Ala Asp Asp Ser Trp Pro Gly Gln Trp Arg Ala Leu Cys Ser Leu Ala
 290 295 300
 Ile Glu Gly Leu Trp Ser Met Asn Phe Thr Phe Asn Lys Glu Asp Thr
 305 310 315 320
 Glu Ile Glu Gly Leu Glu Val Pro Phe Ile Asp Ser Leu Tyr Glu Phe
 325 330 335
 Asn Ile Leu Gln Lys Ile Asn Asp Cys Gly Gly Cys Thr Thr Phe Thr
 340 345 350
 His Leu Ser Phe Gln Glu Phe Phe Ala Ala Met Ser Phe Val Leu Glu
 355 360 365
 Glu Pro Arg Glu Phe Pro Pro His Ser Thr Lys Pro Gln Glu Met Lys
 370 375 380
 Met Leu Leu Gln His Val Leu Leu Asp Lys Glu Ala Tyr Trp Thr Pro
 385 390 395 400
 Val Val Leu Phe Phe Gly Leu Leu Asn Lys Asn Ile Ala Arg Glu
 405 410 415
 Leu Glu Asp Thr Leu His Cys Lys Ile Ser Pro Arg Val Met Glu Glu
 420 425 430
 Leu Leu Lys Trp Gly Glu Glu Leu Gly Lys Ala Glu Ser Ala Ser Leu
 435 440 445
 Gln Phe His Ile Leu Arg Leu Phe His Cys Leu His Glu Ser Gln Glu
 450 455 460
 Glu Asp Phe Thr Lys Lys Met Leu Gly Arg Ile Phe Glu Val Asp Leu
 465 470 475 480
 Asn Ile Leu Glu Asp Glu Glu Leu Gln Ala Ser Ser Phe Cys Leu Lys
 485 490 495
 His Cys Lys Arg Leu Asn Lys Leu Arg Leu Ser Val Ser Ser His Ile
 500 505 510
 Leu Glu Arg Asp Leu Glu Ile Leu Glu
 515 520

A1
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 <211> 2575
 <212> DNA
 <213> Homo sapiens

<220>
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 <222> (2)...(2575)

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gag gag gaa gtc aag caa gaa gaa tgt gac cat ttg gac cgc ctt ttt 97
 Glu Glu Val Lys Gln Glu Glu Cys Asp His Leu Asp Arg Leu Phe
 20 25 30

gct ccc aag gaa gct ggg aaa cag cca cgt aca gtg atc att caa gga 145
 Ala Pro Lys Glu Ala Gly Lys Gln Pro Arg Thr Val Ile Ile Gln Gly
 35 40 45

cca caa gga att gga aaa acg aca ctc ctg atg aag ctg atg atg gcc	193
Pro Gln Gly Ile Gly Lys Thr Thr Leu Leu Met Lys Leu Met Met Ala	
50 55 60	
tgg tcg gac aac aag atc ttt cgg gat agg ttc ctg tac acg ttc tat	241
Trp Ser Asp Asn Lys Ile Phe Arg Asp Arg Phe Leu Tyr Thr Phe Tyr	
65 70 75 80	
ttc tgc tgc aga gaa ctg agg gag ttg ccc cca acg agt ttg gct gac	289
Phe Cys Cys Arg Glu Leu Arg Glu Leu Pro Pro Thr Ser Leu Ala Asp	
85 90 95	
ttg att tcc aga gag tgg cct gac ccc gct gct cct ata aca gag atc	337
Leu Ile Ser Arg Glu Trp Pro Asp Pro Ala Ala Pro Ile Thr Glu Ile	
100 105 110	
gtg tct caa ccg gag aga ctc ttg ttc gtc atc gac agc ttc gaa gag	385
Val Ser Gln Pro Glu Arg Leu Leu Phe Val Ile Asp Ser Phe Glu Glu	
115 120 125	
ctg cag ggc ggc ttg aac gaa ccc gat tcg gat ctg tgt ggt gac ttg	433
Leu Gln Gly Gly Leu Asn Glu Pro Asp Ser Asp Leu Cys Gly Asp Leu	
130 135 140	
atg gag aaa cgg ccg gtg cag gtg ctt ctg agc agt ttg ctg agg aag	481
Met Glu Lys Arg Pro Val Gln Val Leu Leu Ser Ser Leu Leu Arg Lys	
145 150 155 160	
<i>A1</i>	
aag atg ctc ccg gag gcc tcc ctg ctc atc gct atc aaa ccc gtg tgc	529
Lys Met Leu Pro Glu Ala Ser Leu Leu Ile Ala Ile Lys Pro Val Cys	
165 170 175	
ccg aag gag ctc ccg gat cag gtg acg atc tca gaa atc tac cag ccc	577
Pro Lys Glu Leu Arg Asp Gln Val Thr Ile Ser Glu Ile Tyr Gln Pro	
180 185 190	
cgg gga ttc aac gag agt gat agg tta gtg tat ttc tgc tgt ttc ttc	625
Arg Gly Phe Asn Glu Ser Asp Arg Leu Val Tyr Phe Cys Cys Phe Phe	
195 200 205	
aaa gac ccg aaa aga gcc atg gaa gcc ttc aat ctt gta aga gaa agt	673
Lys Asp Pro Lys Arg Ala Met Glu Ala Phe Asn Leu Val Arg Glu Ser	
210 215 220	
gaa cag ctg ttt tcc ata tgc caa atc ccg ctc tgc tgg atc ctg	721
Glu Gln Leu Phe Ser Ile Cys Gln Ile Pro Leu Leu Cys Trp Ile Leu	
225 230 235 240	
tgt acc agt ctg aag caa gag atg cag aaa gga aaa gac ctg gcc ctg	769
Cys Thr Ser Leu Lys Gln Glu Met Gln Lys Gly Lys Asp Leu Ala Leu	
245 250 255	
acc tgc cag agc act acc tct gtg tac tcc tct ttc gtc ttt aac ctg	817
Thr Cys Gln Ser Thr Ser Val Tyr Ser Ser Phe Val Phe Asn Leu	
260 265 270	

ttc aca cct gag ggt gcc gag ggc ccg act ccg caa acc acc cag cac cag	865
Phe Thr Pro Glu Gly Ala Glu Gly Pro Thr Pro Gln Thr Gln His Gln	
275 280 285	
ctg aag gcc ctg tgc tcc ctg gct gca gag ggt atg tgg aca gac aca	913
Leu Lys Ala Leu Cys Ser Leu Ala Ala Glu Gly Met Trp Thr Asp Thr	
290 295 300	
ttt gag ttt tgt gaa gac gac ctc cgg aga aat ggg gtt gtt gac gct	961
Phe Glu Phe Cys Glu Asp Asp Leu Arg Arg Asn Gly Val Val Asp Ala	
305 310 315 320	
gac atc cct gcg ctg ctg ggc acc aag ata ctt ctg aag tac ggg gag	1009
Asp Ile Pro Ala Leu Leu Gly Thr Lys Ile Leu Leu Lys Tyr Gly Glu	
325 330 335	
cgt gag agc tcc tac gtg ttc ctc cac gtg tgt atc cag gag ttc tgt	1057
Arg Glu Ser Ser Tyr Val Phe Leu His Val Cys Ile Gln Glu Phe Cys	
340 345 350	
gcc gcc ttg ttc tat ttg ctc aag agc cac ctt gat cat cct cac cca	1105
Ala Ala Leu Phe Tyr Leu Leu Lys Ser His Leu Asp His Pro His Pro	
355 360 365	
gct gtg aga tgt gta cag gaa ttg cta gtt gcc aat ttt gaa aaa gca	1153
Ala Val Arg Cys Val Gln Glu Leu Leu Val Ala Asn Phe Glu Lys Ala	
370 375 380	
AI	
agg aga gca cat tgg att ttt ttg ggg tgt ttt cta act ggc ctt tta	1201
Arg Arg Ala His Trp Ile Phe Leu Gly Cys Phe Leu Thr Gly Leu Leu	
385 390 395 400	
aat aaa aag gaa caa gaa aaa ctg gat gcg ttt ttt ggc ttc caa ctg	1249
Asn Lys Lys Glu Gln Glu Lys Leu Asp Ala Phe Phe Gly Phe Gln Leu	
405 410 415	
tcc caa gag ata aag cag caa att cac cag tgc ctg aag agc tta ggg	1297
Ser Gln Glu Ile Lys Gln Gln Ile His Gln Cys Leu Lys Ser Leu Gly	
420 425 430	
gag cgt ggc aat cct cag gga cag gtg gat tcc ttg gcg ata ttt tac	1345
Glu Arg Gly Asn Pro Gln Gly Gln Val Asp Ser Leu Ala Ile Phe Tyr	
435 440 445	
tgt ctc ttt gaa atg cag gat cct gcc ttt gtg aag cag gca gtg aac	1393
Cys Leu Phe Glu Met Gln Asp Pro Ala Phe Val Lys Gln Ala Val Asn	
450 455 460	
ctc ctc caa gaa gct aac ttt cat att att gac aac gtg gac ttg gtg	1441
Leu Leu Gln Glu Ala Asn Phe His Ile Ile Asp Asn Val Asp Leu Val	
465 470 475 480	
gtt tct gcc tac tgc tta aaa tac tgc tcc agc ttg agg aaa ctc tgt	1489
Val Ser Ala Tyr Cys Leu Lys Tyr Cys Ser Ser Leu Arg Lys Leu Cys	
485 490 495	

ttt tcc gtt caa aat gtc ttt aag aaa gag gat gaa cac agc tct acg Phe Ser Val Gln Asn Val Phe Lys Lys Glu Asp Glu His Ser Ser Thr 500 505 510	1537
tcg gat tac agc ctc atc tgt tgg cat cac atc tgc tct gtg ctc acc Ser Asp Tyr Ser Leu Ile Cys Trp His His Ile Cys Ser Val Leu Thr 515 520 525	1585
acc agc ggg cac ctc aga gag ctc cag gtg cag gac agc acc ctc agc Thr Ser Gly His Leu Arg Glu Leu Gln Val Gln Asp Ser Thr Leu Ser 530 535 540	1633
gag tcg acc ttt gtg acc tgg tgt aac cag ctg agg cat ccc agc tgt Glu Ser Thr Phe Val Thr Trp Cys Asn Gln Leu Arg His Pro Ser Cys 545 550 555 560	1681
cgc ctt cag aag ctt gga ata aat aac gtt tcc ttt tct ggc cag agt Arg Leu Gln Lys Leu Gly Ile Asn Asn Val Ser Phe Ser Gly Gln Ser 565 570 575	1729
gtt ctg ctc ttt gag gtg ctc ttt tat cag cca gac ttg aaa tac ctg Val Leu Leu Phe Glu Val Phe Tyr Gln Pro Asp Leu Lys Tyr Leu 580 585 590	1777
agc ttc acc ctc acg aaa ctc tct cgt gat gac atc agg tcc ctc tgt Ser Phe Thr Leu Thr Lys Leu Ser Arg Asp Asp Ile Arg Ser Leu Cys 595 600 605	1825
<i>A1</i> gat gcc ttg aac tac cca gca ggc aac gtc aaa gag cta gcg ctg gta Asp Ala Leu Asn Tyr Pro Ala Gly Asn Val Lys Glu Leu Ala Leu Val 610 615 620	1873
aat tgt cac ctc tca ccc att gat tgt gaa gtc ctt gct ggc ctt cta Asn Cys His Leu Ser Pro Ile Asp Cys Glu Val Leu Ala Gly Leu Leu 625 630 635 640	1921
acc aac aac aag aag ctg acg tat ctg aat gta tcc tgc aac cag tta Thr Asn Asn Lys Lys Leu Thr Tyr Leu Asn Val Ser Cys Asn Gln Leu 645 650 655	1969
gac aca ggc gtg ccc ctt ttg tgt gaa gcc ctg tgc agc cca gac acg Asp Thr Gly Val Pro Leu Leu Cys Glu Ala Leu Cys Ser Pro Asp Thr 660 665 670	2017
gtc ctg gta tac ctg atg ttg gct ttc tgc cac ctc agc gag cag tgc Val Leu Val Tyr Leu Met Leu Ala Phe Cys His Leu Ser Glu Gln Cys 675 680 685	2065
tgc gaa tac atc tct gaa atg ctt ctg cgt aac aag agc gtg cgc tat Cys Glu Tyr Ile Ser Glu Met Leu Leu Arg Asn Lys Ser Val Arg Tyr 690 695 700	2113
cta gac ctc agt gcc aat gtc ctg aag gac gaa gga ctg aaa act ctc Leu Asp Leu Ser Ala Asn Val Leu Lys Asp Glu Gly Leu Lys Thr Leu 705 710 715 720	2161

tgc gag gcc ttg aaa cat ccg gac tgc tgc ctg gat tca ctg tgt ttg Cys Glu Ala Leu Lys His Pro Asp Cys Cys Leu Asp Ser Leu Cys Leu 725 730 735	2209																																																																																																																																																																																																																																
gta aaa tgt ttt atc act gct gct ggc tgt gaa gac ctc gcc tct gct Val Lys Cys Phe Ile Thr Ala Ala Gly Cys Glu Asp Leu Ala Ser Ala 740 745 750	2257																																																																																																																																																																																																																																
ctc atc agc aat caa aac ctg aag att ctg caa att ggg tgc aat gaa Leu Ile Ser Asn Gln Asn Leu Lys Ile Leu Gln Ile Gly Cys Asn Glu 755 760 765	2305																																																																																																																																																																																																																																
atc gga gat gtg ggt gtg cag ctg ttg tgt cgg gct ctg acg cat acg Ile Gly Asp Val Gly Val Gln Leu Leu Cys Arg Ala Leu Thr His Thr 770 775 780	2353																																																																																																																																																																																																																																
gat tgc cgc tta gag att ctt ggg ttg gaa gaa tgt ggg tta acg acg Asp Cys Arg Leu Glu Ile Leu Gly Leu Glu Glu Cys Gly Leu Thr Ser 785 790 795 800	2401																																																																																																																																																																																																																																
acc tgc tgt aag gat ctc gcg tct gtt ctc acc tgc agt aag acc ctg Thr Cys Cys Lys Asp Leu Ala Ser Val Leu Thr Cys Ser Lys Thr Leu 805 810 815	2449																																																																																																																																																																																																																																
cag cag ctc aac ctg acc ttg aac acc ttg gac cac aca ggg gtg gtt Gln Gln Leu Asn Leu Thr Leu Asn Thr Leu Asp His Thr Gly Val Val 820 825 830	2497																																																																																																																																																																																																																																
gta ctc tgt gag gcc ctg aga cac cca gag tgt gcc ctg cag gtg ctc Val Leu Cys Glu Ala Leu Arg His Pro Glu Cys Ala Leu Gln Val Leu 835 840 845	2545																																																																																																																																																																																																																																
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ctg act att gat tgc aat gct tcc ggg gca acg gca cct ccg tgc tgt Leu Thr Ile Asp Cys Asn Ala Ser Gly Ala Thr Ala Pro Pro Cys Cys 965 970 975	2986
gac ttt ttt tgc tgagcagcct gggatcgctc tacgaattac acaggaagcg Asp Phe Phe Cys 980	3038
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Pro Leu Glu Asp Val Leu Gln Lys Thr Pro Trp Ser Glu Val Glu Glu
 35 40 45

Ala Asp Gly Lys Lys Leu Ala Glu Ile Leu Val Asn Thr Ser Ser Glu
 50 55 60

Asn Trp Ile Arg Asn Ala Thr Val Asn Ile Leu Glu Glu Met Asn Leu
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Thr Glu Leu Cys Lys Met Ala Lys Ala Glu Met Met Glu Asp Gly Gln
 85 90 95

Val Gln Glu Ile Asp Asn Pro Glu Leu Gly Asp Ala Glu Glu Asp Ser
 100 105 110

Glu Leu Ala Lys Pro Gly Glu Lys Glu Gly Trp Arg Asn Ser Met Glu
 115 120 125

Lys Gln Ser Leu Val Trp Lys Asn Thr Phe Trp Gln Gly Asp Ile Asp
 130 135 140

Asn Phe His Asp Asp Val Thr Leu Arg Asn Gln Arg Phe Ile Pro Phe
 145 150 155 160

Leu Asn Pro Arg Thr Pro Arg Lys Leu Thr Pro Tyr Thr Val Val Leu
 165 170 175

His Gly Pro Ala Gly Val Gly Lys Thr Thr Leu Ala Lys Lys Cys Met
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Leu Asp Trp Thr Asp Cys Asn Leu Ser Pro Thr Leu Arg Tyr Ala Phe
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Tyr Leu Ser Cys Lys Glu Leu Ser Arg Met Gly Pro Cys Ser Phe Ala
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Glu Leu Ile Ser Lys Asp Trp Pro Glu Leu Gln Asp Asp Ile Pro Ser
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Ile Leu Ala Gln Ala Gln Arg Ile Leu Phe Val Val Asp Gly Leu Asp
 245 250 255

Glu Leu Lys Val Pro Pro Gly Ala Leu Ile Gln Asp Ile Cys Gly Asp
 260 265 270

Trp Glu Lys Lys Pro Val Pro Val Leu Leu Gly Ser Leu Leu Lys
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Arg Lys Met Leu Pro Arg Ala Ala Leu Leu Val Thr Thr Arg Pro Arg
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Ala Leu Arg Asp Leu Gln Leu Leu Ala Gln Gln Pro Ile Tyr Val Arg
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Val Glu Gly Phe Leu Glu Glu Asp Arg Arg Ala Tyr Phe Leu Arg His
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Phe Gly Asp Glu Asp Gln Ala Met Arg Ala Phe Glu Leu Met Arg Ser
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Pro Thr Cys Leu Thr Arg Thr Gly Leu Phe Leu Arg Phe Leu Cys Ser
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Arg Phe Pro Gln Gly Ala Gln Leu Arg Gly Ala Leu Arg Thr Leu Ser
 405 410 415

Leu Leu Ala Ala Gln Gly Leu Trp Ala Gln Met Ser Val Phe His Arg
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A1

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 485 490 495
 Ile Gly Asp Val Gln Lys Leu Leu Ser Gly Glu Glu Arg Leu Lys Asn
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 Lys Pro Leu Ser Val Thr Asp Leu Lys Glu Val Leu Gly Cys Leu Tyr
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 Glu Ser Gln Glu Glu Glu Leu Ala Lys Val Val Val Ala Pro Phe Lys
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 Glu Ile Ser Ile His Leu Thr Asn Thr Ser Glu Val Met His Cys Ser
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 Phe Ser Leu Lys His Cys Gln Asp Leu Gln Lys Leu Ser Leu Gln Val
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 Ala Lys Gly Val Phe Leu Glu Asn Tyr Met Asp Phe Glu Leu Asp Ile
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 Glu Phe Glu Arg Cys Thr Tyr Leu Thr Ile Pro Asn Trp Ala Arg Gln
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 Arg Asp Phe Cys Leu Ala Phe Ile Gly Lys Lys Thr Leu Thr His Leu
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 Cys Asp Leu Leu Arg Asn His Lys Cys Asn Leu Gln Tyr Leu Arg Leu
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 Lys His Phe Leu Gln Met Leu Ser Leu Glu Asn Cys Arg Leu Thr Glu
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 Thr His Leu Cys Leu Ala Lys Asn Pro Ile Gly Asp Thr Gly Val Lys
 850 855 860
 Phe Leu Cys Glu Gly Leu Ser Tyr Pro Asp Cys Lys Leu Gln Thr Leu
 865 870 875 880

A1

Val Leu Gln Gln Cys Ser Ile Thr Lys Leu Gly Cys Arg Tyr Leu Ser
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 915 920 925
 Pro Asn Cys Asn Leu Lys His Leu Arg Leu Lys Thr Tyr Glu Thr Asn
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A1

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 Asn Leu Ser Asp Lys Glu Phe Gln Ser Phe Lys Lys Tyr Leu Ala Arg
 20 25 30

aag att ctt gat ttc aaa ctg cca cag ttt cca ctg ata cag atg aca 144
 Lys Ile Leu Asp Phe Lys Leu Pro Gln Phe Pro Leu Ile Gln Met Thr
 35 40 45

aaa gaa gaa ctg gct aac gtg ttg cca atc tct tat gag gga cag tat 192
 Lys Glu Glu Leu Ala Asn Val Leu Pro Ile Ser Tyr Glu Gly Gln Tyr
 50 55 60

ata tgg aat atg ctc ttc agc ata ttt tca atg atg cgt aag gaa gat 240
 Ile Trp Asn Met Leu Phe Ser Ile Phe Ser Met Met Arg Lys Glu Asp
 65 70 75 80

ctt tgt agg aag atc att ggc aga cga aac cat gtg ttc tac ata ctt 288
 Leu Cys Arg Lys Ile Ile Gly Arg Arg Asn His Val Phe Tyr Ile Leu
 85 90 95

caa tta gcc tat gat tct acc agc tat tat tca gca aac aat ctc aat 336
 Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Tyr Ser Ala Asn Asn Leu Asn
 100 105 110

gtg ttc ctg atg gga gag aga gca tct gga aaa act att gtt ata aat 384
 Val Phe Leu Met Gly Glu Arg Ala Ser Gly Lys Thr Ile Val Ile Asn
 115 120 125

A1

ctg gct gtg ttg agg tgg atc aag ggt gag atg tgg cag aac atg atc Leu Ala Val Leu Arg Trp Ile Lys Gly Glu Met Trp Gln Asn Met Ile 130 135 140	432
tcg tac gtc gtt cac ctc act tct cac gaa ata aac cag atg acc aac Ser Tyr Val Val His Leu Thr Ser His Glu Ile Asn Gln Met Thr Asn 145 150 155 160	480
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ccc att gca gac atc ctg tct gat ccc aag aaa ctc ctt ttc att ctc Pro Ile Ala Asp Ile Leu Ser Asp Pro Lys Lys Leu Leu Phe Ile Leu 180 185 190	576
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cgt gac ttc cag ctc tgc tgc caa aca ccc act gat cta cat gcc cac Arg Asp Phe Gln Leu Cys Cys Gln Thr Pro Thr Asp Leu His Ala His 325 330 335	1008
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A1

tat cac cta ggt ctc cta aaa cgt ctg tgt ttg ctg gct gca gga gga		1104
Tyr His Leu Gly Leu Leu Lys Arg Leu Cys Leu Leu Ala Ala Gly Gly		
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ctg ttt ctg agc acc ctg aat ttc agt ggt gaa gac ctc aga tgt gtt		1152
Leu Phe Leu Ser Thr Leu Asn Phe Ser Gly Glu Asp Leu Arg Cys Val		
370	375	380
ggg ttt act gag gct gat gtc tct gtg ttg cag gcc gcg aat att ctt		1200
Gly Phe Thr Glu Ala Asp Val Ser Val Leu Gln Ala Ala Asn Ile Leu		
385	390	395
ttg ccg agc aac act cat aaa gac cgt tac aag ttc ata cac ttg aac		1248
Leu Pro Ser Asn Thr His Lys Asp Arg Tyr Lys Phe Ile His Leu Asn		
405	410	415
gtc cag gag ttt tgt aca gcc att gca ttt ctg atg gca gta ccc aac		1296
Val Gln Glu Phe Cys Thr Ala Ile Ala Phe Leu Met Ala Val Pro Asn		
420	425	430
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Tyr Leu Ile Pro Ser Gly Ser Arg Glu Tyr Lys Glu Lys Arg Glu Gln		
435	440	445
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Tyr Ser Asp Phe Asn Gln Val Phe Thr Phe Ile Phe Gly Leu Leu Asn		
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Met Val Asp Ser Phe Lys Trp Tyr Ser Val Gly Tyr Met Lys His Leu		
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Asp Arg Asp Pro Glu Lys Leu Thr His His Met Pro Leu Phe Tyr Cys		
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Leu Tyr Glu Asn Arg Glu Glu Phe Val Lys Thr Ile Val Asp Ala		
515	520	525
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Leu Met Glu Val Thr Val Tyr Leu Gln Ser Asp Lys Asp Met Met Val		
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Ser Leu Tyr Cys Leu Asp Tyr Cys Cys His Leu Arg Thr Leu Lys Leu		
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A1

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Gln Leu Ala Tyr Asp Ser Thr Ser Tyr Ser Ala Asn Asn Leu Asn 100 105 110	
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Ser Leu Leu Lys Arg Lys Met Ala Pro Gly Cys Trp Phe Leu Ile Ser 225 230 235 240	

A1

Ser Arg Pro Thr Arg Gly Asn Asn Val Lys Thr Phe Leu Lys Glu Val
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A1

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A1

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A)